Interreg - IPA CBC
Bulgaria - Serbia

Project title: Joint cross-border initiatives for creation of eco friendly region CBOO7.1.32.361

PROGRAMME AND RESEARCH OF THE PROTECTION OF RARE RIVER SPECIES - STREAM TROUT FROM STARA PLANINA

The project is co-funded by EU through the Interreg-IPA CBC Bulgaria–Serbia Programme.

Introduction

When drafting this document, the authors were asked to show the importance of ichthyofauna, which is a natural habitat in clean, clear and fast rivers on Stara planina. The primary emphasis is on the stream trout, as an indigenous fish species threatened by extinction due to overfishing and deterioration of the natural environment in which it lives.

The programme contains seven thematic units that systematically encompass the region of Stara planina with its characteristics, biological characteristics and the prevalence of stream trout, the level of endangerment of the species, measures and models for the protection of stream trout, as well as the possibilities for improving the fish stocks by organizing a natural hatchery at the Dojkinačka River. The work is corroborated by the valid data presented in the text and in the tables.

The document that is before you aims at giving a much clearer picture of the current situation with recommendations for the preservation of rare riverine species on Stara planina.

Team of authors

1. Stara planina as a natural habitat of endangered species

1.1 General remarks on the area of Stara planina

Stara Planina in Serbia is part of the Balkan Mountains, its western and smaller part. It covers the area of four administrative municipalities of Pirot (63,194 ha), Knjaževac (57,968 ha), Zaječar (9,958 ha) and Dimitrovgrad (11,099 ha). The main fishing waters of Stara Planina are Crnovrška river, Golema reka, the river basins of the river Visočica and river basins of Toplodolska river. The most important stillwater fishery of this area is the Zavojsko Lake, formed by artificial means from the river Visočica. All the waters of Stara Planina flow into the Danube and across the Danube into the Black Sea.

Stara planina has an enviable history of protection of the area itself as well as plant and animal biodiversity. In 1966, the first protected natural well-being was "The Tree of Small Borders". This was done on the proposal of the then Serbian Institute for Nature Protection. The next move was the proclamation of seven special reserves and three natural monuments in the municipalities of Pirot and Knjaževac, in the 80s of the 20th century.

In 1996, Stara Planina was proclaimed a valuable natural area from the point of view of the diversity of biotic communities, geomorphological, geological, hydrological and hydrogeological characteristics, as well as the sustainability of traditional forms of life and the preservation of cultural assets. The Spatial Plan of the Republic of Serbia points out the value of Stara Planina, not only highlighted at the regional level, but also as an extremely important region of state, between the state (border region) and the international (Biosphere Reserve MAB[1], IBA[2] area) interest.

In 1997, the Government of the Republic of Serbia adopted the Decree on the Protection of the Nature Park Stara Planina («Official Gazette of the Republic of Serbia», No. 19/97) by which Stara Planina was placed in the first category of protection. It was proclaimed the Nature Park of the first category and of great national importance. A large number of localities in the territory of Stara Planina got the status of protected natural assets, reserves and / or monuments of nature. Nature Park Stara Planina has been administered by the Public Enterprise "Srbijašume",based in Pirot, according to the decision of the Government of the Republic of Serbia.

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[1]MAB area - The Institute for Nature Protection of Serbia has allocated nine biosphere reserves, among which the Stara Planina National Park is based on the project "Support to Protected Natural Areas", which are part of the Parks for Life Action Plan of the IUCN and EUROPARC bearers

[2]IBA - Important Bird Area. Stara Planina is one of the 42 internationally important areas for birds.

Other years of great significance in regulating the protection of Stara planina are, at first, 2003 when the study of the protection of the nature park Stara Planina was finished and 2005 when the Spatial Plan of the nature park and the tourist region Stara planina were completed. The division of the area of Stara Planina into the territories with three different degrees of protection was carried out on the basis of these two documents and their adaptation: Zone I of protected area with the surface of 4,160 ha (3,65%); Zone II of protected area with the surface of 19,679 ha (17.21%) and Zone III of protected area with the surface of 90.493 ha (79.15%). The area of the nature park Stara Planina exceeds 142 thousand hectares.

1.2 Hydro potential of the Nature Park "Stara Planina"

Pursuant to the Decree on the Establishment of the Spatial Plan of the Nature Park and the Stara planina region, most of the waters of the fishing areaof Stara Planina are classified in the Protection Zone I.

The most important central river of this region is Crnnovrška river. It joins Stanjan River and builds Trgovski Timok. In addition to this, a significant river of this area is also Toplodolska river which occurs at a high altitude (over 1000 m) by joining a larger number of streams. The River Temska connects with the Visočica River below Lake Zavoj and all the water from the south side of the park leads to the river Nišava. All the aforementioned waters have characteristics of fast and cold mountain rivers. They are rich in water throughout the year, and their water level is not called into question. However, these watercourses have a sparkling character that is expressed during the spring months and during summer rains. In particular, this refers to the Toplodolska river, whose river bottom is covered with stone slabs, walls, cascades and sources of different depth levels.

A very important role of the Stara Planina Nature Park is also taken by the artificial reservoir lake - Zavoj Lake (Zavojsko jezero). It was created in 1963 when a large slope made a natural dam on which an artificial dam was later built. The water from this lake is taken to the hydroelectric power plant "Pirot" via the tunnel. The water regime of Zavoj Lake depends to a lesser extent on climatic and natural conditions. For the water level of the lake, the regime of the hydroelectric power plant "Pirot" is decisive.

In the hydro-potential of the Old Mountain there are many waterfalls that give authenticity to this unique mountain range. The abundance of waterfalls (some of the most famous are: Pilj waterfall, with its 64 m height, is one of the highest in Serbia, upper and lower Čungulj, Vurnje waterfall, Tupavica waterfall and many others). Mountain streams, springs, rapids and river sinks are characterized by this landscape. The highest peak of Stara Planina is Midžor (2,169 meters above sea level), which is

at the same time the highest peak of Serbia. In addition to him, the following peaks are dominant: Babin zub (1.758 meters above sea level), Tri čuke (1.937 meters above sea level), Orlov Kamen (1.737 meters above sea level) and many others.

In accordance with the Decision on the Determination of Fishing Areas («Official Gazette of the Republic of Serbia, No. 115/2007, 49/2010 and 602012), the Nature Park Stara planina is categorized into the fishing area« Serbia - East »(out of the existing 6 fishing regions). This fishing area extends from the border of the National Park "Đerdap", the state border with the Republic of Romania, the state border with the Republic of Bulgaria and the state border with FRJ Macedonia, the borders of the fishing areas "Serbia - Center", "Serbia - Southwest" and "Serbia - South »[3]. In this fishing area, commercial fishing is strictly prohibited.

1.3 Endangered plant species of Stara Planina (the Old Mountain)

Stara planina is an area that has exceptional biodiversity.

The Flora of Stara Planina, with its prevalence and authenticity, is characterized by great endangerment. There are 147 different plant species, among which these are recognizable for the wider and professional public: dwarf mountain pine (pine krivulj), bushy alder, steppe oak, mountain windflower, mountain flower, Kosovo peony, dew flower, mountain maple, forest lily, dwarf iris, turf orchid etc. Even 40 plant species have been under protection because of their habitats that are endangered or because of their paucity. Stara planina is divided into 6 altitude vegetation zones. This division is carried out by the frequency of similar plant species that are characteristic of individual territorial units. Thus, there is a beech zone (beech belt), an oak belt, a bushy vegetation of Siberian Juniper, blueberries and subalpine spruce, etc. All available plant communities intertwine in different habitats, either meadow, forest or pasture lands..

1.4 Endangered animal species of Stara Planina

The high diversity of animal species is a special feature of the Old Mountain. Fauna makes: 116 kinds of day butterflies; 18 types of herpetofauna - 6 species belonging to the class of amphibians, and 12 species of reptiles; ichthyofauna presented with 26 species; 203 bird species[4]. Particularly with regard to birds, the largest visible diversity as well as specimens of rare species, have their habitats on Stara planina. Following the diversity of birds this area is well known in the Balkans, and therefore Stara planina is included in the register of areas of international importance for birds of Europe - IBA. Endangered bird species are: boreal owl,

[3] Resolution about fishing area («National Gazette, no. 115/2007, 49/2010 i 602012)

[4] www.srbijasume.rs/pdf/Staraplanina.doc

peregrine falcon, mountain woodpecker,long-legged buzzard, golden eagle, grouse, Scops owl, tawny owl and many others.

In addition to the birds, Stara Planina is inhabited by wild rabbits,roe deer, wild boar, mountain deer (which used to be widespread), sometimes pheasants and bears which sometimes wander from neighboring Bulgaria. Wild boar and roe deer inhabit forested areas, rich in water and pastures. From the rich nomenclature of animals, predators such as the wolf (its population is stable), foxes, lynx and jackal (settled here in the last two decades) are distinguished. The main threat to the game on the slopes of Stara Planina is uncontrolled hunting and poaching and inadequate organization of hunting services, which due to poor organization and inadequate equipment does not cover the whole territory interesting for hunting.

1.5 Endangered riverine species of Stara Planina

Rivers of Stara Planina are attractive to all visitors, especially passionate fishermen and sports fishing enthusiasts. Numerous mountain rivers and streams abound with diverse ichthyofauna. The entire area of Stara Planina is represented by the salmonid region (inhabited by the species of the Salmonidae family, primarily by the stream trout), while the Lake Zavoj is predominantly inhabited by cyprinidae species of fish (minnow, chub, sheat fish, European perch). Species whose population is aggressively decreasing are stream trout, gudgeon and chub. Besides the fish, fire salamander, the European crayfish and numerous species of frogs have inhabited the watercourses of Stara Planina. And the otter, which almost does not exist in the rivers of Serbia, is not a rarity in the area of Stara planina.

1.5.1. Stream trout

The synonym of pure mountain water and undiscovered area, among other endangered riverine species, is just a stream trout. It is widespread in all watercourses. The importance of its preservation and protection against extermination is great. It has been elaborated in detail in the next section (2. biological map of the trout of Stara planina) as well as in the entire study, and under this chapter it is only underlined and emphasized its priority place in the watercourses on Stara planina.

1.5.2. The western Balkan barbel

The Latin name is the Barbus Pepeloponnesius. It lives in a middle-flow river and on a sandy and pebbled bottom. In winter, it is collected in a flock and it stays in depth, while under good weather conditions it settles rapids with large stones, places where there is a great flow of water. It has a spindle shape, a strong fins and a tiny scales. The body is silver - brown with brown spots on the back and sides. The fins are gray brown with brown dots. It grows up to 40 cm and lives on rocky, pebbly or rocky soil. Young fish feed on invertebrates and plants, and adults eat both eggs and younger fish. It matures on rocky ground, in shallow waters with rapid water currents in the period from May to July. The most common specimens are weighing from half to one kilogram, although they can reach even greater weight, up to 10 kilograms.

1.5.3. Chub

Chub is a freshwater fish and belongs to the carp family. The name in Latin is Leuciscus ceplalus. Its body is elongated and strong, the head is as big as the mouth that sucks the food. Its mouth is large and at the very end it reaches the lower edge of the eye. His back is greenish, his hips yellow and his belly white. The color of the body varies from dark green, over gray and even black. The maximum weight is about 4 kilograms and the length it can reach is 80 cm. Juvenile chub lives on invertebrates (crabs, larvae of insects) and older specimens eat even fish. It spawns from April to June. It lays up to 200,000 pieces of roe whose incubation lasts 6 to 8 days. It reaches full maturity within a year. Its life span is 8 - 9 years. It is very adaptable to different environments, but it's typical for living and surviving in clean waters. The places where they are located are the middle and lower parts of the watercourses with hard and rocky substrates

1.5.4. Sheatfish

Sheatfish- Silurus glanis belongs to the Siluridae family. It is a riverine species, even the largest river fish in Serbia after the European sturgeon (which does not inhabit the watercourses of Stara Planina). It has a big flattened head and large mouth. It is recognizable by mustaches that are 2 on the upper jaw and are significantly longer than those on the lower jaw. It loves calm and sludgy waters. It lives mostly in the Lake Zavoj. It is an omnivore which feeds on fish, frogs, crabs. It is mostly fed at night. It spawns during warmer months, May and June, when the water temperature reaches a level of 19 to 24 degrees.

1.5.5. Otter

Otter or the Latin Lutra Lutra (Linna Zeus) is endangered river species and natural rarity not only on Stara Planina but in Serbia as a whole. It comes from the marten family, it is adapted to living in the fresh water. It's a very good swimmer and a hunter. It is very sensitive to pollution of the environment and urbanization of the natural environment. Its reproductive abilities are limited, and the mortality of the young is high. The aforementioned reasons are only some of which lead to the extinction and disappearance of this animal species. It inhabits temperate rivers and wetland forests and shrubbery. It is located in the Lake Zavoj, river Visočica, Toplodolska River and Temstica.

1.5.6. European crayfish

European crayfish, in Latin Astacus astacus, lives in the rivers of Stara Planina which are pure and unpolluted. It tolerates temperatures up to 26 degrees. Although widespread, this riverine species is protected because it is prone to extinction. Hunting is not allowed except for educational purposes. European crayfish and otter are typical only for waters of exceptional quality and purity. Their presence in the hydropotential of Stara Planina proves that the waters are first-rate.

2. Biological map of the stream trout on StaraPlanina

By the end of the 20th century, 50 different species of stream trout were discovered. As it has different adaptive and migratory abilities, trout is classified into 3 groups: Salmo trutta morpha truta - sea trout, salmo trutta morpha lacustris - lake trout and salmo trutta morphafario - river form of trout. All forms of trout spawn in fresh water, but sea and lake trout, with their migratory characteristics throughout life, move to the sea and/or lake in search of food, while only stream trout is a stable resident and its movement is only within its natural environment.

In the rivers of Stara Planina, 26 species of fish were identified. Stream trout is an indicator of the preservation of rivers and river ecosystems, an indicator of clean and usable water. It is the most famous, most recognizable and best-studied vertebrate that is a trademark of unpolluted aquatic environment.

2.1 Anatomical features of the stream trout

The stream trout belongs to the family of Salmonida, and its Latin name is Salto Truth. Stream trout is a medium-sized fish, usually, about 400 mm long, and capital samples can reach up to 850 mm. Its body is spherical. On the body, there are red (bright orange) or black spots. The color of the trout's body varies depending on the morphological conditions of the environment in which it lives. Body color variations are considered an adaptive ability that contributes to survival under given conditions. Such adaptability contributes to the increase of the potential for survival, maintenance, and existence. On the back, besides the back fin, there is another fin that allows it to diminish the turbulence of the water. It also has tail fin and its entire body is covered with scales. Bones of the jaw, both upper and lower, are jagged. On the upper jaw, there are two to six strings of teeth and only one in the lower jaw. It has a swim bladder. The stomach is well developed with a lot of muscles.

The stream trout inhabits the preserved natural watercourses, with great water transparency and an average temperature of 10 to 15 degrees. The presence of oxygen is to a large extent necessary for its growth, development, and reproduction. It is an autochthonous species (inhabiting the area of its natural distribution) as opposed to allochthonous species that are brought from some other regions and which are not the area of their natural habitat.

2.2 Characteristics of the stream trout on Stara Planina

Parameters describing the ecosystems inhabited by the stream trout on Stara Planina are numerous. The mountain rivers (Crnovrška, Toplodolska reka and Visočica) are relatively fast, with speed ranging from 0.8 to 2.2 m / s. The river bed is mostly stony and rocky, made of rock and stone, gravel and pebbles, sand and silt. The width of the river bed is 4 to 10 m. The depth of water is small, on average about half a meter, and ranges from 0.2 to 1.2 m. All rivers are located at an altitude of over 500 m (Golema reka at 1004m). The average water temperature is 13 degrees. All rivers are rich in oxygen whose average values are from 9 to 12 mg / l. The fishing area "Bobovište" on the river Visočica and "Temstica" within the trapped meanders of the river Temstica are distinguishedaccording to the presence of indigineous species of fish and the attractive natural watersheds.[5]

The artificial lake Zavoj that belongs to Stara Planina has slightly different characteristics. The shape of the lake is elongated and the average depth is about 30 m while its maximum depth is 112 m. The great depth is good because there is no rapid eutrophication of the so-called "water bloom" (overlapping area with aquatic algae which "steal" oxygen from ichthyofauna). Oxygen is present to the bottom of the lake at an average concentration of about 5 mg / l. The reservoir Lake Zavoj is rich in various types of fish, mostly white.

2.3 Reproduction and nutrition

Stream trout spawn in the period from October to February in fresh water. They are in pairs. During spawning the male and female members of the species go through certain morphological changes. Males change the shape of the skull (stretching out) and small degeneration appears on the lower jaw. The females have a larger stomach (full of ripe roe) and a urogenital red opening. They spawn at the bottom of riverbeds, on pebbly and rocky terrain. At the bottom, they prepare nests by hollowing out depressions in riverbeds into which they lay eggs. The depth of the depressions should be optimal, not too shallow so that the water will not take it away, and not too deep to avoid the problem of oxygen deficiency. After the spawning, the females leave the trunk and the males watch them over and keep them for a while. The number of eggs varies from 500 to 30,000 pieces. After fertilization, eggs are covered with gravel.

Their life cycle in the egg takes from 6 to 8 weeks. After that, embryos are converted into prelarve (engl. alevin), which are still connected to embryonated ova. In this form, they abstain for the next 4 to 6 weeks and partly move on the riverbed. After that, they swim and

[5] https://www.topirot.com/multimedija/brosure

start their eating cycle. Their growth is gradual, and after one year they have a length of about 10 cm, and after two years about 25 cm. They reach full maturity from 2 to 3 years, and their maximum life span is 20 years. During life, they spawn 2 to 3 times. The rule is that the trout that reach maturity live shorter.[6]

Their food depends on the habitat, the period of the year, and their own size. They feed on planktons, insects, molluscs, frogs and smaller fish. The crucial organ for finding food is their sight, so water transparency is decisive for their nutrition and housing in certain terrains.

In the rivers of the Stara Planina, stream trout does not reach a large length nor weight, from 35 to 40 cm and up to 1 kilogram of weight. In our country fishing stream trout is not allowed by using natural baits, but artificial fly and cheaters.[7]

2.4 Prevalence

The area of the Stara Planina Nature Park is typically salmonid, and the stream trout is in all the streams only in different concentrations. It is mostly widespread in Golema reka, the tributaries of the Crnovrška reka, in the amount of 180 to 210 units per kilometer. The population of stream trout in other rivers is about 40 units/km. This is not a satisfactory number because the capacity of the habitat is higher and the conditions for development are optimal. In Zavoj Lake, along with the stream trout, there are other types of fish that are brought into the fishery area by fish stocking, which influences the increase and the reduced production of stream trout. Indigenous species are stream trout, Spirlin (riffle minnow, Alburnoides bipunctatus), brook barbel and chub and introduced species are roach (the common roach), perch, stone loach, freshwater sunfish and many others.

[6] Ana D. Tošić Filogeografski status i genetička struktura populacija kompleksa potočne pastrmke (Salmo cf. trutta) Đerdapa i Timočke krajine – doktorska disertacija

[7] http://www.ribolov-nautika.com/ribolov/riblji-fond/86-potocna-pastrmka-riba-pecanje.html

Table 1. Qualitative and quantitative presence of fish species - stream trout (salmo trutta) species during the fishing period in December 2012 in the area of the Nature Park "Stara planina"[8]

Golema river		Crnovrška river		Visočica		Jelovička river		Dojkinačka river		Temštica		Zavoj lake	
No of units	% presence	No of units	% presence	No of units	% presence	No of units	% presence	No of units	% presence	No of units	% presence	No of units	% presence
210	100	0	0	75	56,8	65	100	23	100	46	32,85	2	14,8

The presence of stream trout inthe waterways of Stara planina expressed by the numbers of units caught during fishing period 2012

[8]Fisheries Management Program for "Stara Planina" for the period 2013-2022

2. SWOT analysis of the endangered species - stream trout on Stara Planina

Swot analysis is widely applied in all spheres of social life. Its emphasis is mainly on the economy (businesses) but is applicable to other users. It is an effective mechanism for making decisions in a wide variety of situations. It has received a name from the combination of the initial letters of the terms that define it. Respectively, in English Strengths means snage, weaknesses - slabosti, opportunities - mogućnosti (chances) and threats - pretnje (dangers). The aim of the swot analysis is to enable the progress and development of the user by allowing him to figure out his own potential. From the swot analysis, the user identifies his weaknesses and threats, and can minimize them, while at the same time working to improve his strengths and opportunities.

Strengths	**Weaknesses**
- Eco-healthy and clean region - favorable environmental conditions for fish breeding both in qualitative and quantitative terms- - High-quality water - Development of sports fishing - Adequate legal regulations - Tradition in existence - High nutritional value - Protected fish species that contribute to the development of river communities - Complementarity with other activities :sports, tourism ...	- Insufficiently utilized fishing resources - Relatively small trout productivity in relation to potential productivity - Inability to accurately calculate the real production of stream trout in Zavoj Lake - A small percentage of elderly (representative) specimens of stream trout, aged 3 years and over - unfavorable age structure - Low consumption - Unexplored domestic market - Lack of branding
Opportunities	**Threats**
- The real possibility of increasing the stocking of fish stocks - Available watercourses for breeding - Development of ecological breeding of stream trout - Promotion of high nutritional value of stream trout - Contribution to environmental protection and conservation of biodiversity - Approval of dedicated bank loans - Availability of EU funds - Development of rural areas - Povećanjezaposlenosti - Razvoj regiona i ostalih privrednih	- Planned construction of derivative MHE on the territory of Pirot municipality, in the first and second protection zone where there is building ban - Damage from the poaching - Disregard for hunting - Early detection of possible diseases - A more careful approach to possible diseases, development of prevention - Degradation of the environment

(especially tertiary) activities - Increase in exports - Regular systematic fish stocking	

1.Strengths

The region of Stara Planina is ecologically sound and clean and is categorized into a national nature park by the state. The dominant presence of stream trout in the Stara Planina rivers confirms the ecologically sound composition of clean, cold, oxygen-rich water.

The quality of stream trout meat is first-class. The meat is tasty, juicy, without tiny bones. It contains 20% protein, 2% fat, which is an ideal choice for the population of all ages, especially for children and the elderly. The nutritive value of stream trout is very high.

The environmental conditions are in favor of the development of many forms of tourism: leisure and recreational fishing, ethno tourism, gastronomy, sports tourism, scientific-research tourism, organizing schools in nature, etc.

Legislation covering water, nature and environment protection, fishing, is complete and precise. Numerous laws, orders, solutions, policies, regulations bring order into this matter and resolve any possible doubts and ambiguities. The most significant among them are: Law on Nature Protection ("Official Gazette of RS" no.36 / 2009 and 88/2010), Law on Environmental Protection ("Official Gazette of RS" no.135 / 2004 and 36/2009), Law on Protection and Sustainable Use of Fish Fund (Official Gazette of the RS, no.128 / 2014), Law on Waters ("Official Gazette of RS" no.30 / 2010 and 101/2016), Decision on establishment of fishing areas (" Official Gazette of the Republic of Serbia "no.90 / 2015), Order on measures for the conservation and protection of the fish fund (" Official Gazette of RS "no.56 /2015)and many others.

2.Weaknesses

Although the rivers of Stara Planina have optimal conditions for growing stream trout, these conditions are not sufficiently exploited. Indeed, there is very little trout productivity in relation to possible productivity. The annual average trout production in rivers and streams is 7.1 kg per km of river flow. This yield is uneven and insufficient. In the upper part of the Golema Reka the yield is 5 kg per kilometer, and in the Toplodolska river about 9.5 kg/km of the river flow[9]. In Zavoj Lake the yield between the production of fish biomass and real productionis satisfactory, but the percentage share of stream trout in biomass is unsatisfactory - it amounts to only 14.28%. The annual production of fish in biomass is about 20,000 kg. In the case of the Zavoj Lake, this result is expected because the lake is rich in cyprinid fish species that existentially threaten the flowering trout.

According to the age structure, juvenile fish of up to one and two years of age are dominant in rivers and streams, while trouts older than 3 years are rare. This information is devastating when considering the life span of the stream trout.

Eating habits of local and national populations are characterized by the poor use of fish meat in relation to foreign populations. People in the world eat an average of 20 kg of fish per capita, and in Serbia 5 to 7 kg, which is almost three times smaller. The fish found on the domestic table is mainly of import origin. The prices of quality fish are high and the privilege to eat trout is given to residents with a better standard but also to the local population.

3.Opportunities

The simplest way to preserve the fish fund is regular and systematic fertilization. It is necessary that the fertilization is carried out according to the established dynamics, that it should be planned and done to quality young fish, larger specimens, preferably eight months. This would also strengthen the fish stock in a permanent annual increase.

For the long-term preservation of stream trout, it is necessary to encourage investors through bank loans that they would receive under more favorable conditions. Creation of new dedicated credit lines would contribute to the promotion of the breeding of this endangered riverine species. Also, since Serbia is on the path to EU accession, many financial funds are available to it. These opportunities need to be studied, exploited and made available to understandable domestic producers who do not have enough knowledge about funding from European funds.

[9] Program for managing the Stara Planina fishing area for the period 2013-2022

By investing in a stream trout, greater production of protein foods of the domestic origin is achieved. The number of employees in one branch is increasing, and agriculture in general. The revival of production leads to the chain development of industries related to fisheries - food and processing industry, construction, transport. The contribution to the development of the rural environment itself should not be neglected, as well as the possibility of employment of the local population. An incentive policy at the state level related to the production, processing, and marketing of fish would contribute to the fact that fish producers are not in a subordinate position in relation to other agricultural branches. Opportunities for food export are opened.

The state has reduced the tax on fish food and is taxed at a lower tax rate of 10%. Another stimulative measure is that the fee for using water at the fishponds is not paid per kilogram of fish sold, but through the useful production area of the fishpond - in trout ponds per m3 of used waters, and in carp ponds per hectare of the pond area.

4.Threats

Beyond all doubt, the greatest danger to the stream trout and the entire aquatic and underwater ecosystem is the construction of mini-hydropower plants. Mini hydropower plants disturb natural harmony, which in time can lead to negative changes in the environment. Environmental hazards occur during and after construction (during exploitation) of hydropower plants. Devastating impacts on biodiversity occur in the river basin. Their construction causes both the noise of the forest, which leads to erosion, as well as changes in the regime of surface and groundwater. Heavy machinery causes water intakes by which pipelines dig into the river bed, and underwater habitat and ichthyofauna collapse. Dust that occurs affects the increase in humidity, air is polluted, blurred water that leads to oxygen falling, water levels change, leading to the irreversible disappearance of a large number of sustainable fish communities. Ultimately, the climate changes and the likelihood of flooding increases.

Although the construction of such investment projects includes the so-called "Fish trails" where fish smoothly move upstream and downstream from the site of the river barrier, the opinions of the experts do not agree with this solution. The trout is a territorial species of fish, it does not migrate. The rivers of Stara Planina are small in length, 10 to 15 km, and when the turbines are placed on the so small waterways, they endanger the entire aquaculture.

Also, when designing the project documentation, the biological minimum of the water that must remain in the waterway is determined so as not to endanger the riverine species and the environment. This minimum is determined by statistical procedures or a probability account instead of one-year monitoring that should be jointly carried out by experts and competent persons, hydrobiologists and hydrologists. Although all approved projects show that SHPs (mini-hydropower plants) do not have negative ecological effects, the reality is different. The consequences are the destruction of the river beds, the great loss of water, the removal of migratory fish trails, the disturbance of the conditions for the spawning, the temperature

change, the starvation of coastal vegetation, the disappearance of water due to the underground flow.

Poaching and disregard for the ban on hunting negatively affect the fish fund. In the case of fishing for trout, fishing areas that are allowed are marked and limited, both daily and by the calendar. In the period from June 1 to September 31, fishing is allowed in the period from 10 to 19 h. Fishing stream trout is permitted only within the designated sections exclusively from the coast. Night fishing is strictly prohibited and sanctioned.

Restrictions imposed and the number of fishermen must be sent: the maximum daily number of recreational fishermen in the designated locations is: Golema reka - 10, Toplodolska reka - 15, Visočica - 15 and Zavoj Lake - 25. Despite all the measures taken to prevent poaching and save stream trout from extinction, damage done to the fish fund on the basis of poaching is estimated at 20%.

The risk of viral, bacterial and parasitic diseases of fish is present, so health care is a precondition for the sustainability of the fish fund. Seasonal fish losses must be controlled. Fish diseases arise due to the state of stress caused by changes in the normal conditions of the environmental factors, the quality and quantity of water - changes in oxygen concentration in the water, sudden changes in temperature, blur and water pollution. These changes are most common in the summer months.

Still, degradation of the environment in the area of Stara Planina is not an acute problem, although the construction of a winter ski complex, in the long run, can affect the state of the river and nature in this protected area. The hotel complex has sewage treatment equipment. Degradation of the environment by deforestation, waste disposal, unplanned construction, for the time being, is successfully held under control.

4. Level of endangered species –the stream trout of Stara Planina as a threatened species and an overview of existing measures for species protection

The stream trout of Stara Planina (Salmo trutta) is an indigenous species that lives in clean mountain waters for centuries. Like other species of the Salmonidae family, it lives in clear and clean waters that are rich in oxygen, and where the water temperature is low. The area of moderate continental climate corresponds most to them.

4.1. The threat of the stream trout of Stara Planina

The anthropogenic factor is the most expressive when it comes to the threat of stream trout. A man, by his (un) conscientious behaviour, leads to the disappearance of the fish fund which is the centuries-old synonym for the rivers of Stara Planina. The reasons that lead to endangering the stream trout are numerous.

First of all, the human factor is directly influenced by uncontrolled fishing and overfishing. Due to gastronomic pleasure, the stream trout is a target of fishing lovers, but it is also attractive for trade and sale.

Also, the random fish stocking of these areas with grown trout can lead to a change in the genus of stream trout and water quality changes. The process of fertilization should be inspected not to jeopardize the genetic diversity of the stream trout and its evolutionary potential in no way. Also, there is a real danger that the grown, pond trout (primarily the Californian trout which is found in the nearby ponds) is in the natural currents of the river. These fugitive species can be hybridized and lead to a change in species.

The development of agriculture and the use of pesticides lead to the pollution of rivers by the introduction of waste matter, organic pollution, and pesticide poisons into the water, either by being washed from the soil either by movement and by the using water for livestock.

There is also construction as having the same influence. The construction projects which do not even have to be directly related to the river, often lead to the discharge of harmful substances that threaten the underwater world into the river or lead to degradation and destruction of the gravel substrate necessary for reproduction and the spawn of stream trout. Also, all construction interventions that involve the construction of buildings, sewers, and sanitary facilities can degrade natural habitats.

Work on infrastructure, construction of roads and roadways leads to the introduction of surpluses of solids and pollutants, primarily zinc and lead, which are at the same time the most damaging ones.

Water supply through the construction of waterworks can also endanger river ecosystems by taking away water and creating wastewater.

The impact of forestry is significant on the health of the river. In the mountainous areas, there is deforestation, which leads to erosion and increased swelling of water from the altitudes to the rivers. This changes the water acceptance, water level, transparency, temperature, structural composition and other parameters important for the survival of the stream trout. Also, afforestation of the bare surface, can (in addition to all the benefits it has) be fatal to the fish world. Newly grown trees grow with age, spread their crown, create shade and ultimately reduce the temperature of watercourses and light that are necessary for the survival and extension of the species. In the case of coniferous plantations, there is a latent risk of acidification (acidification) when a single isotope of aluminum appears in the soil (which is otherwise present in the soil), which can be fatal to the stream trout even in the ions of larger quantities than allowed.

However, the greatest danger to ichthyofauna is the construction of dams and bridges, and above all hydroelectric power plants. The downstream streams suffer various changes in temperature, flow and chemical changes in water. By constructing power plants, complete degradation of river beds is carried out and the total water flow is taken off. The life of the river is destroyed, the paths and the watering places are displaced, and the coastal vegetation is crushed. More than 60 requests have been submitted for the construction of small hydroelectric power plants in the Stara Planina area. If they are approved and if they are to be implemented, Stara Planina will lose the attributes of a protected first-class natural good, and they will endanger the conservation of the indigenous population of stream trout. The hydropotential of the Stara Planina is our genetic treasure, and the biological diversity and the existence of varieties that do not live in other parts of Serbia gives a legal basis for protecting the rivers and preventing the construction.

In the spatial plan of the Municipality of Pirot in 2011, it is planned to revitalize 58 water mills and rollers (used for laundry) in order to encourage rural tourism and people return to the villages.

4.2. Measures to protect the stream trout

Numerous studies and analyzes point to the unsatisfactory state of the trout population in relation to potential habitat opportunities. Salmonid region is impoverished and regraded. In

order to increase the number of trout, in the previous period, the following measures have been taken.

- The region is supplied periodically, without precisely determined time dynamics and quantity. However, the quantities of juvenile fish have increased over time. Thus, for example, In 2011 and 2012, there was no fish stocking of the rivers on Stara Planina. In 2013, at the mouth of Visočica in the Lake Zavoj, juvenile fish of stream trout was released in the amount of 15,000 pieces. Next year, 2014, watercourses on Stara Planina were fish-stocked with 25,000 pieces (7,500 pieces in Crnovrška and Golema reka and 10,000 pieces in the Visočica river). In 2015, 2016 and 2017, the rivers on Stara Planina were fish-stocked with 25,000 stream trout. The breeding was done by older fish and larger specimens, with proper transport, during a period of stable water level, temperature and optimal water transparency. The breeding sites were rich in underwater moss, pebbly and located at least 2 km from each other.
- Prohibition of incompetent and self-inducing watercourses
- Permanent ban on the hunting of protected and endangered species according to the regulation of the Fisheries Act («Official Gazette of RS» no.12 of 19 April 1995) dated 14 October 2003
- Compliance with the Hunting Order («Official Gazette of the Republic of Serbia» No. 100/03 of 14 October 2003)
- Measures for preserving natural fruits during the spawning period
- Prohibition of sport fishing in the period after 19:00 to 10:00 in the morning - the ban on night fishing
- Compliance with the Order («Official Gazette of the Republic of Serbia» No. 100/03 of 14 October 2003) prohibiting the hunting of specimens of certain species of fish whose length is below the minimum length prescribed for that species. A stream trout with the length below 25 cm must immediately return to the fishing water at the catch site
- The ban on the removal of gravel and sand on the watercourses at the time of spawning of the stream trout
- Timely reaction in case of drying or effluence of water-rich areas
- Prohibit the use of nets, explosives and other methods largely used
- Fishing for stream trout should be done only with artificial fly
- Intensify the work of the guard service that will control the fishermen in accordance with the provisions of the Fisheries Act
- Placing boards near the river indicating which species of fish are subject to hunting restrictions, the hunting restriction period, and the minimum catch limit.

- Protecting the fish fund from potential predators, birds, frogs, snakes and other species that endanger the fish by organizing hunting and reducing the number of the aggressive population. On the other hand, it must be carefully done, as they are most often fed with the damaged and diseased fish, and thus contribute to preserving the balance of aquatic ecosystems.
- Prevention of spreading bacteria-infected diseases, viruses, parasites.
- Keeping in mind the balance between the beasts of prey and silent fish
- Not discharging wastewater into watercourses without pre-filtration of the same.
- Quality control of water by timely water sampling.
- Implementation of accurate records of membership of fishing associations based on issuing fishing permits
- Publishing editions and educating the population about the significance of the waters on Stara Planina and their Ichthyofauna

5. Possibilities for organizing natural trout hatchery on Stara Planina

5.1. Basic characteristics of the Eco-mountain campsite as the part of the existing Youth Center in the village of Dojkinci

The Mountain lodge in Dojkinci was transformed into a sports and recreation center by EU funds. Within the framework of the project "Joint Cross-Border Initiative for the Establishment of an Environmentally Healthy Region", it is planned the construction of an educational eco mountain camp, whose future will significantly contribute to raising the awareness of citizens on the importance of preserving and protecting the diversity of Stara Planina. The existing facility has adequate accommodation units and the construction of the camp opens possibilities for organizing one-day activities in order to promote environmental values. Right next to this complex, the river Dojkinačka is rich with stream trout. The possibilities for organizing a natural reservoir on this river are ideal because all parameters that define water quality are favorable.

Table 2 Morphometric and physical characteristics of the Dojkinačka River[10]

Parametres	Values
Altitude (m)	744
River bed width (m)	3 – 5
Water depth (m)	Do 0,8
Characteristics of the bottom (%)	
Rocks and pebble stone	70
Stone of the size of a hand	20
Gravel, pebbles	2,5
Sand	2,5
Sludge	2,5
Detritus	2,5
Water temperature° C	16,9
Water spped (m/s)	1,4
Electroconductivityηsim/cm3	134

Table no. 3 Chemical characteristics of the water of Dojkinačka River[11]

Parametres	Values
pH of the water	7,76
Oxygen concentration (mg/l)	11,5
Oxygen saturation (%)	103,1
Nitratesas N (mg/l)	5,8
Amonia (mg/l)	0,63
Phosphatesas P (mg/l)	0,14

Dojkinačkariver meets the basic requirements for the selection of sites for the production of juvenile stream trout. There is relatively constant content of water in the flow during most of the year and it does not blur (and when it gets dim - when it rains, during snow melting, the blur period lasts briefly). It is a mountain river, at a high altitude where the water flow is poorly expressed. A specialized pond for producing juvenile fish can be built in it for spawning and rearing of stream trout up to one year of age which would serve for stocking not only Dojkinačkariver, but other rivers on StaraPlanina.

[10]Fisheries Management Program for Stara Planina for the period 2013-2022. years

[11]Fisheries Management Program for Stara Planina for the period 2013-2022. years

Having in mind the cross-border region Bulgaria-Serbia (Pirot and Montana area), it can be said that rivers on Stara planina have properties similar the rivers on the opposite side and thus show considerable potential for the formation of hatcheries.

5.2. Basic conditions for the production of juvenile fish

The conditions for the production of juvenile fish are as follows:

1. Clear water. The primary factor of all production of juvenile fish is clear water. The period of blur should not be longer than 2 to 3 days, as it leads to the fact that the fish can not take food due to sedimentation of sludge on the gills and is especially unfavorable for incubation eggs and juvenile trout.

2. Water temperature. The required water temperature for the egg and juvenile trout oscillates within the limits of 6 to 17 degrees. It can survive under extreme temperatures, above 20 ° C and below 5 ° C, in a short period of time.

3. Chemical properties of water. Water properties such as pH values of water, nitrate, phosphate, ammonia and other parameters (given in Table 3) correspond to the prescribed standards for the given parameters.

4. The content of oxygen. The amount of oxygen in the water that is needed for growing juvenile fish should amount to more than 7 mg / l, which in the case of the Dojkinačka river is almost twice as high. Otherwise, the amount of oxygen in water is inversely proportional to the water temperature - the higher the water temperature, the more oxygen content of the water is caused.

5. PH value of water. The optimum value is neutral pH = 7. The limit values are from 6.7 to 8.2. Excessive and too low boundary pH values are deadly both for juvenile fish and for adults of stream trout.

6. Carbon dioxide CO2. Low carbon content (2 mg / l) is an indicator of environmental non-pollution.

7. Gases in water. Gases like ammonia, methane, hydrogen sulfide must be in small quantities.

8. Water polluting substances. Heavy metals, detergents, phenols ... must not be contained in water, not even at the least amount, as they lead to the death of the eggs in incubation and newly formed juvenile fish.

9. Space is not a factor that influences the cultivation of juvenile fish because it has no effect on the viability of production, but therefore the quality of water and the amount of water in the flow are decisive factors.

Before deciding on the construction of hatcheries, fishing experts must conduct a detailed survey of the terrain, especially marking the watercourse. They have to determine the optimum location in the river bed which would be formed as a vertical structure hatchery. The fall of the terrain and the place which is protected by the arrival of torrential water is crucial in determining the location of the micro-hatcheries. Before entering the hatchery, the water must be impeccably clean, so before entering, it passes through filters for sand and gravel.

The hatchery should ensure the preservation of mature fertile females before the spawn, spawning implementation, incubation of the roe and hatching of larvae up to 3 months old. There are options for such organizing, and it is the task for competent and professional individuals and institutions to take advantage of these opportunities in a positive way. With the existence of hatcheries that produce indigenous stream trout fry, all the rivers and streams of Stara Planina would enhance their fish stocks. The region, which is famous for being salmonid, would decently wear that title because of the improvement of the status of fish in its rivers and streams. The current average number of population of trout is 40 units per kilometer of the watercourse, which is unsatisfactory density in relation to the capacity of the habitat. By stocking, biomass would multiply. Forming the hatchery is a real step towards the enrichment of fish stocks in Dojkinačka River, and other rivers of the mountain areas.

6. The role of public opinion and institutions in the protection of riverine species on Stara Planina

The primary task of state authorities and the chains of all hierarchical lower authorities is to carry out activities that will lead to an increase in the awareness of the national population about the necessity of preserving the natural environment. Raising awareness of the importance of environmental protection is a long-lasting process that needs to be carried out in a planned and systematic manner. The priority objective is to promote and encourage understanding of the importance of preserving biodiversity, to prevent devastation of hydro potential and to preserve nature. How citizens will understand and be prepared to accept environmental guidelines depends largely on proper communication.

Public opinion is formed under the influence of education, upbringing and the media, and in recent times, social networks have a growing impact. It is, therefore, necessary that information related to the conservation of nature be made available to the public through the media, primarily through television programs with national frequency at the prime time. The creation of public opinion also contributes to local media that have an impact on the population of a region, and are more effective when dealing with local problems. Awareness raising campaign on the values of the watercourses on Stara Planina, the factors that threaten the fish fund and its protection should be implemented through various media and be complementary.

The possibilities of the Internet are practically unlimited at the present moment when it is easily accessible to every user. It would be practical and efficient to create an Internet website on ichthyofauna in the rivers and streams of Stara Planina. Although there is no such specialized website, there are many websites that offer visitors information on riverine and stream species, their vulnerability and protection within their context.

There are many groups of nature lovers on Facebook and Instagram. We should not ignore their influence on the propagation and visibility of the eco-ideas as well as the linking of the like-minded people. The most lenient example is the facebook group "Defend the rivers of Stara Planina" which has more than 80,000 members and the slogan of this group is "Say No to MHE". Their struggle is not only virtual but also realistic (negotiations, correspondence, meetings with representatives of various levels of government, the organization of protests, working actions, etc.) in order to prevent the construction of mini-hydropower plants on the rivers Stara Planina.

The education system includes information about Stara Planina only in fragments, without highlighting the importance of the origin, importance, status and protection of the nature park. The creation of environmental awareness is influenced by training and lectures that can be organized for students, locals, hunters and fishermen, teachers and professors, journalists and all interested parties.

The care of riverine species of Stara Planina is under the authority of numerous institutions. The top of the list is, of course, the Ministry of Environmental Protection which is a crucial institution. Within its jurisdiction, it carries out the protection of water from pollution in order to prevent degradation of surface and groundwater quality. This Ministry approves fisheries management programs, issues decisions on changing the fishery regime, issues licenses for fish translocation, licenses for the reintroduction of indigenous fish species and licenses for supplying fishing waters with indigenous species of fish originating from import. It issues consent to the ban on commercial fishing, issues licenses for fishing and electro-balls for scientific research purposes, allows for the passage of a professional exam and licensing of fishermen, etc.[12]

The Ministry of Agriculture, Forestry and Water Management has the importance for preserving fish species through the Republic Water Directorate, as an administrative body within the Ministry. It carries out tasks related to the policy of water management, water supply, water protection, regulation of water regime, the inspection in the field of water management and other activities specified by law.[13]

[12] http://www.ekologija.gov.rs/usluge/zivotna-sredina/usluge-iz-oblasti-zastite-i-odrzivog-koriscenja-ribljeg-fonda/

[13] http://www.minpolj.gov.rs/ministarstvo/nadleznost/

State enterprise for forest management (Šumsko gazdinstvo "Pirot"), based in Pirot, has a direct influence, which is part of the state enterprise "Srbijašume" which is a user of the fishing area Stara Planina. Its activities within the hydroelectric reservoir of the rivers on Stara Planina are focused on studying and analyzing the physical, chemical, morphometric and biological characteristics of aquatic ecosystems, categorization of fishing waters, determination of fish species, assessment of their biomass and annual production, fertilization, organization of fishermen's service, prevention of water pollution in fishery area, determination of permitted fishing by species and quantities, adoption and implementation of measures for the protection of hatcheries, measures for the protection and sustainable use of fish stock and its increase, conditions for performing fishing activities and measures for their improvement as well as for improving fishing tourism in fishing area[14]. They issue annual and daily licenses for recreational fishing, organize sporting competitions in fishing. The Forestry estate Pirot is most directly concerned with the conservation of the fish fund because the Nature Park Stara Planina is under its direct jurisdiction(it was given to them for management).

Through its activities, the tourist organization Pirot influences the promotion and raising awareness of the importance of the natural environment and the preservation of the fish fund. As part of its regular activities, the Pirot Tourism Organization organizes various excursions for nature lovers. One of them is a fishing package that offers a fishing program for fly fishing - fishing stream trout on the rivers of Stara Planina. Work on the marketing and recognizability of Stara Planina is also visible through the publication of a series of brochures showing its beauty and potentials. "The Hunting and fishing" publication displays the rivers of Stara Planina, which run at different heights, have a different depth and soil configuration and offer numerous possibilities of different fishing techniques. Each year, there is also a Hunting and Fishing Fair organized by TOP, which is receptive to fishing enthusiasts, but also for all curious visitors.

On the Territory of the municipalities where Stara Planina extends, there are many fishing societies and associations. According to the records of the Association of Serbian sports fishermen In the East Zone, the region of Pirot, the following associations and organizations of sport fishermen were registered: in Pirot two associations of recreational fishermen "Pastrmka" and "Sidro", in Dimitrovgrad "Nisava", "Banjica" in Bela Palanka, "Young fisherman" in Babušnica. The main activity of these associations is sports fishing, preservation of ecosystems and organization of competitions in sports fishing. The role of these organizations in forming public opinion, although not dominant, is visible.

[14] Program for managing the Stara Planina fishing area for the period 2013-2022

7.Presentation of further measures and models of protection of riverine species - stream trout on Stara Planina

Pursuant to Article 18 of the Law on Protection and Sustainable Use of Fish Fund («Official Gazette of RS» No. 36/09) according to which the user of the fishing area located on the territory of the national park is obliged to harmonize the park management program with the protection and development program of the park, that is, with the Spatial Plan of the Special Purpose Area of the Nature Park and with the Strategic Assessment of the Influence of the Subject Plan[15]. This law regulates the fish fund as well as its protection and use in fishing waters. The management of the fish fund is carried out in accordance with the principle of sustainable use, which contributes to the preservation of the diversity of ichthyofauna and the ecological integrity of aquatic ecosystems. Fish fund in fishing waters is state owned[16]. This law envisages a series of prohibitions aimed at preserving the fish fund. Some of them are: destroying fish younger at the time of the spawn and closed hunting season; hunting fish by hand, explosives and spraying agents, electricity ...; interruption of migratory fish paths, night hunting, change of existing watercourse morphology, unauthorized fish stocking; use of toxic bait to limit the number of pests, etc.

7.1. Further measures for the protection of river species - stream trout

Based on these documents, the following measures are envisaged in Nature Park Stara planina, with the aim of preventing riverine species (primarily stream trout and river crayfish), :

1. complete protection of the ecosystem of the rivers on Stara planina and especially in the regime of I and II degree of protection. A recreative type of fishing stream trout is permitted only in the zones of the III level of protection, in the areas where recreational fishing is allowed. The following sections are foreseen for recreational fishing:

- Great river - from the bridge over the main asphalt road in the village of Crni Vrh up to 2 km upstream.
- Toplodolska river - from the river mouth of Visočica up to 3 km upstream.
- Visočica - from the mouth of the Zavoj Lake up to 3 km upstream.
- Zavoj Lake - 500 m from the dam along the left bank 5 km long to the mouth of Visočica.

[15] Law on Protection and Sustainable Use of Fish Fund («Official Gazette of RS» no. 36/09

[16] Law on Protection and Sustainable Use of Fish Fund («Official Gazette of RS», 128/2014

On rivers, a maximum of 9 capital copies of the stream trout can be caught annually (3 on each of the foreseen river sections), and at the Lake of Zavoj more than 5 copies.

2. The trout fishing shall cease when the allowable quota is fulfilled. Fishermen's service decides on the final suspension of fishing.

3. The trout fishing will only be allowed with artificial baits.

4. Trout fishing will take place on the "catch and let" principle, which means that only larger fish species can be kept. On the Crnovrška, Golema and Toplodolska rivers as well as on Visočica, only those specimens with a length of not less than 25 cm can be retained. All fishes smaller than 25 cm must be returned to the water. On Zavoj Lake, the minimum length of the stream trout must be 45 cm. Regular control of size and species of fish.

5. The trout fishing is allowed for a limited period of time between 1 June and 30 September each year.

6. Daily fishing is limited from 10h to 19h every day.

7. Fishing at Zavoj Lake is subject to restrictions - fishing from boats and watercraft is prohibited, the use of scooters is prohibited; It is forbidden to ski on the water.

8. Arrange with the Pirot hydroelectric power plant so that the water is not discharged abruptly from the accumulation at the time of the spawn of trout.

9. Alongside the river, set up information boards with measures related to recreational fishing of stream trout.

10. When issuing fishing licenses to fishermen, printed publications (leaflets, flyers) relating to recreational trout fishing may be shared.

11. Permanently prohibit fishing in all habitats of stream trout, and in particular, the sites of spawning should be placed under increased surveillance and protection at the time of the spawn.

12. Reduce the impact of potential polluters located in the area of Stara planina: an existing winter tourist complex, cottages and houses on the shores of Zavoj Lake, which do not have regulated utilities and the use of boats and boats with internal combustion engines on artificial accumulation Zavoj.

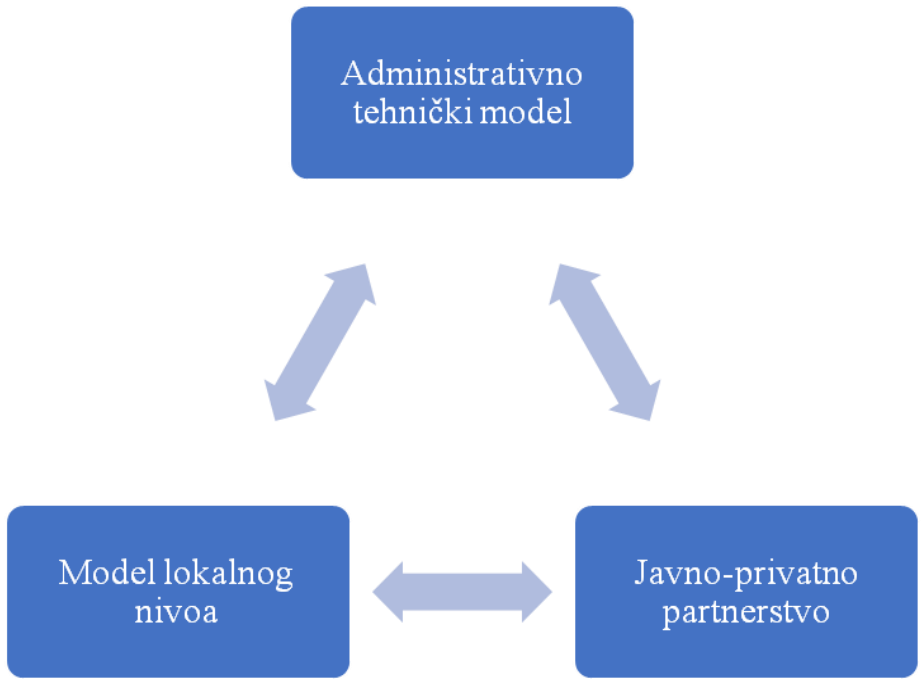
13. Encourage the social responsibility of citizens and businesses because they are potential polluters of water and nature. Citizens can promote a healthy region by networking the propagation of a healthy eco-region, communicating with their friends or through social networks.In the mountain shelter <dojkinci, It is possible to organize eco workshops for children, pupils and adults, in the hut, in the home, as well as in the yard, in the open air, which is under construction. The possibilities for holding workshops on the threat of river species are unlimited. Within each training or workshop, a one-day module can be devoted to the stream trout. The popularization of ecology and love of nature would be done in a natural environment, which would make the effect even greater.

14. Apart from respecting regulations and legislation, it is necessary to promote fishing and eco-bontons, which would include: returning fish into the water if it is below the measure and / or full of roe, respect the principle of capture and release, do not create noise in the fishing area, do not squash water , turn off the boat if it passes by the place where others are fishing, do not leave trash, paper and waste on the shore or in the water, etc. Brochures can be published in which the rules of the bonton should be comprehensively illustrated.

All measures undertaken as well as those whose creation is in progress are aimed at preserving and improving the stream trout, for the benefit of both the natural area and the inhabitants of the region of Stara planina. The stream trout is our genetic treasure to be preserved and in that sense it takes all the necessary steps which we mentioned here about how this animal species would continue its unhindered existence in the area of Stara planina.

7.2 Models of riverine species protection - stream trout of Stara Planina

Models of the protection of river species can be conceived through three segments, or three groups of models. This is an administrative-technical model for the protection of river species, a model of local level protection of river species and public-private partnership as a model for the protection of river species.



7.2.1. Administrative-technical model of river species prevention

The administrative-technical model stems from the laws and regulations, from the legal regulation that covers the preservation of the environment, natural habitats and plant and animal populations. This model can be realized only with strict adherence to the measures related to the protection of the ecosystem of the river on Stara planina. The legislation that covers this delicate area is sufficient and extensive. Prevention of river species, primarily stream trout, is regulated by measures restricting fishing at the daily and annual levels, which prohibits night fishing as well as fishing for live and natural baits. The quantities of catches are strictly defined, as well as the number of capital copies that can remain in the possession of the fisherman. The trout hunting in the period of the spawn is strictly prohibited as well as fishing the stream trout in a larger quantity than prescribed.

This model should strengthen the sanctioning or the implementation of penal policy. Legal regulations that relate to the violation of standards and the pursuit of sport fishing have been established. Penalties are established, starting from the seizure of all fishing equipment used for poaching, also fines and imprisonment, depending on the severity of the violation of regulations and laws. The fishermen's service needs to be strengthened, to enable better coverage of all the river systems on Stara planina, so that the misdemeanors and abuses will be less. Enhanced control would result in the conservation of fish biomass.

7.2.2. Model of local level of protection of river species

For the preservation of the river and the healthy natural environment, the local community is primarily responsible. Citizens and organizations can and should influence the preservation of rivers and the environment, each in the domain of their possibilities, but also in a consortium. There are numerous fishing associations, companies, organizations that are interested in preserving the fish fund within the fishing area Stara planina. Also, institutions such as the State enterprise for forestry management "Šumsko gazdinstvo " Pirot (whose operational competence is the preservation of the fishing area of Stara planina), the Tourist Organization of Pirot and the tourist organizations of neighboring municipalities, should cooperate with the preservation of the ecosystem by their cooperation and joint work. Fish stocking actions that directly affect the increase in the fish stock should be carried out systematically and contractually. The policy for issuing fishing licenses must be harmonized but also controlled. With fishing licenses, it is also desirable to offer potential fishermen a brochure or flyer with precisely determined fishing areas, with rules that must be respected, with fishing bans, in order to be educated on regular fishing on time, and ,at the same time,on conserving fish species and the environment.

Only the local population has a personal interest not to jeopardize the environment. The main goal is not to pollute the rivers and the ichtyofauna in them. They do this indirectly, taking care not to devastate the land when performing agricultural works, not to ruin the river banks, not to throw the waste in the river as well as dead animals, etc. It is desirable to educate the population about the importance of preserving the river (media, workshops, written brochures ...) and thus influence the raising of the environmental awareness of the local population.

7.2.3. Public-Private Partnership Model for the Protection of River Species

A public - private partnership can be a very effective model for the protection of river species. The need for "association of private and public exists in all spheres of the social system, and it is possible to be applied in the creation of an adequate model of protection of river species and the natural environment in general. In order to achieve more extensive protection of river species, it is possible to organize certain bodies that would consist of representatives of public institutions and representatives of the non-governmental sector. Such a body may have the form of a Council for monitoring the condition of river species, whose primary task would be to monitor the state and migration of the fish population with their preservation and improvement. In addition to its core activities, this body can initiate decision-making at a higher level in its work and contribute to the maintenance and protection of river species on Stara planina Mountain.NGOs are the bearers of quality ideas in the field of ecology and biodiversity, are professionally trained, able to approach the "ecological" problem to citizens through various performances, but they also need the support of the state apparatus in order to integrate their attitudes and proposals into the measures and provisions prescribed by the competent organs.That is why it is recommended to form through this model a working body that will have its own system of work and work on the protection of river species continuously.

All measures and models mentioned above are aimed at preserving Stara planina as a geological and hydro-treasury of Serbia. We have inherited this task and we are obliged to transfer it to the next generations preserved and improved.

Survival and improvement of stream trout is the priority task not only to higher authorities such as the Ministry of Environment, but also local communities and citizens and in the spatial plan of Stara Planina. There are opportunities, legislation also, but concrete measures such as stocking, organizing hatcheries, controlled fishing, the road to preserving and increasing the representation of stream trout in the watercourses of Stara planina are open questions.

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This publication has been produced with the assistance of the European Union through the Interreg-IPA CBC Bulgaria-Serbia Programme, CCI No 2014TC16I5CB007. The contents of this publication are the sole responsibility of CENTRE FOR DEVELOPMENT SUPPORT AND INITIATIVE "NOVITAS" PIROT and can in no way be taken to reflect the views of the European Union or the Managing Authority of the Programme.